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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,267	08/10/2001	Christopher D. Creech	018512-006510US	6230

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EXAMINER

LI, RUIXIANG

ART UNIT	PAPER NUMBER
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1646

DATE MAILED: 07/11/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/927,267

Applicant(s)

CREECH ETAL.

Examiner

Ruixiang Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 and 21-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 19, and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicants' election with traverse of Group I, Claims 1-9, 19, and 20, in Paper No. 10 is acknowledged. The traversal is on the grounds (i) that Groups I-II stem from a common concept and theory, and are related; and (ii) that prosecution of the claims of Groups I-II would not place a substantially greater burden on the Examiner. This is not found persuasive because the elected Group I and Group II (Claim 10), while related as product and process of use, are distinct and require non-cohesive searches and considerations.

The requirement is still deemed proper and is therefore made FINAL.

2. During a telephone conversation with Annette S. Parent (Reg. No. 42058) on June 17, 2002, a provisional species election of SEQ ID NOS: 12 and 13 was made with traverse to prosecute Claim 5. Affirmation of this election must be made by applicant in replying to this Office Action.
3. Applicants' amendment in paper No. 3 has been entered in full. Claims 1-40 are pending. Claims 1-9, 19, and 20 are under consideration. All other claims are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Priority

4. Acknowledgment is made of a claim for domestic priority under 35 U.S.C. 119(e) to a provisional application, 60/226,253, filed on August 17, 2000.

Objections to Drawings

5. The drawings, Figs. 1-4, filed on 08/10/2001 are accepted by the Examiner.

Rejections—35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 1-9, 19, and 20 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well-established utility.

Claims 1-9, 19, and 20 are drawn to a putative subunit of a cyclic nucleotide gated cation channel, human CNG2B protein, and a method of producing the protein. The claimed invention is not supported by either a specific and substantial asserted utility or a well-established utility. A specific and substantial utility is one that is particular to the subject matter claimed and that identifies a "real world" context of use for the claimed invention which does not requires further research.

The instant disclosure asserts numerous utilities for the claimed invention based upon sequence homology of the predicted amino acid sequence of the claimed CNG2B protein with a rat olfactory cyclic nucleotide-gated channel (rat OCNC2; page 7, line 7; page 62, last two paragraphs). The disclosure further claims that the amino acid sequence of SEQ ID NO: 1 is the human ortholog of rat OCNC2 and likely serves a similar functional role (page 62, last paragraphs). However, the sequence homology of CNG2B with known proteins is insufficient to satisfy the utility

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requirement under 35 U.S.C. §101. This is because the instant disclosure fails to provide any experimental data or information on whether the claimed CNG2B protein functions like a cyclic nucleotide-gated channel and determination/confirmation of the biological functions or activities of CNG2B requires significant further research. In view of the diversity of structure and functions of the cyclic nucleotide-gated channels (*IDS paper C*, Finn et al, Cyclic nucleotide-gated ion channels: an extended family with diverse functions. *Annu. Rev. Physiol.*, 58:395-426, 1996), prediction of function using comparative sequence analysis may lead to the creation and propagation of assignment errors if not performed appropriately (See, Peer Bork and Eugene V. Koonin, Predicting functions from protein sequences--where are the bottlenecks? *Nature Genetics* 18:313-318,1998). There are putative seven transmembrane molecules, which do not appear to be coupled to a G protein (Ji et al. G-protein-coupled receptors, *J. Biol. Chem.*, 273:17299-17302, 1998). Thus, all the asserted utilities in the disclosure based upon the protein homology are not specific and substantial, as exemplified below.

The instant disclosure asserts the uses of the CNG2B protein as a reporter molecule in assay and detection systems, e.g., to measure changes in cation concentration, membrane potential, or current flow (page 7, 3rd paragraph). The disclosure also asserts that the claimed invention provides for a method of screening mutations of CNG2B genes or proteins (page 7, last paragraph). However, such uses are all considered research uses only designed to identify a particular function of the claimed molecules and are not a substantial utility. See, e.g., *Brenner v. Manson*, 383

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U.S. 519, 148 USPQ 689 (Sup. Ct. 1966) wherein a research utility was not considered a "substantial utility." Moreover, such uses are not specific to the instant molecule but applicable to other nucleic acids or proteins.

The instant disclosure further asserts that the claimed inventions provides methods of screening for modulators of the CNG2B protein and such modulators would be useful in the treatment of neurological disorders (page 7, 1st paragraph). The disclosure further asserts that detection of CNG2B nucleic acid and protein expression allows diagnosis of neurological disorders (page 7, last but one paragraph). These asserted utilities are not specific and substantial because they do not identify or reasonably confirm a "real world" context of use. The disclosure neither identifies the biological functions of the claimed proteins nor any disorders that are associated with the claimed molecules. Clearly, further research would be required to determine the functions of the claimed molecules or to identify a disease that can be treated or diagnosed with the claimed molecules See *Brenner v. Manson*, 383 U.S. 519, 148 USPQ 689 (Sup. Ct. 1966), noting that "a patent is not a hunting license. It is not a reward for the search, but compensation for its successful conclusion."

The invention also lacks a well-established utility. A well-established utility is a specific, substantial, and creditable utility that is well known, immediately apparent, or implied by the specification's disclosure of the properties of a material. The homology of the predicted amino acid sequence of the claimed CNG2B protein with a rat olfactory cyclic nucleotide-gated channel (rat OCNC2) does not endow the claimed molecules with a specific and substantial utility. No art of record discloses or

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suggests any property or activity for the claimed molecules such that another non-asserted utility would be well-established for the compounds.

8. Claims 1-9, 19, and 20 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Furthermore, even if the nucleic acid molecules of SEQ ID NOS: 2 and 3 or encoding the amino acid sequence of SEQ ID NO: 2 were to have a patentable utility, the instant disclosure would not be found to be enabling for the full scope of the claimed invention.

The factors that are considered when determining whether a disclosure satisfies enablement requirement include: (i) the quantity of experimentation necessary; (ii) the amount of direction or guidance presented; (iii) the existence of working examples; (iv) the nature of the invention; (v) the state of the prior art; (vi) the relative skill of those in the art; (vii) the predictability or unpredictability of the art; and (viii) the breadth of the claims. *Ex Parte Forman*, 230 USPQ 546 (Bd Pat. App. & Int. 1986); *In re Wands*, 858 F. 2d 731, 8 USPQ 2d 1400 (Fed. Cir. 1988).

Claims 1, 3, and 8 are drawn to a genus of nucleic acid molecules encoding a polypeptide comprising an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 1 or comprising a nucleotide sequence having at least 90% sequence identity to SEQ ID NO: 2 or SEQ ID NO: 3. Claims 19 and 20 depend on Claim 1. However, other than SEQ ID NOS: 1-3, the disclosure does not provide

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sufficient guidance and information regarding the structural and functional requirements commensurate in scope with what is encompassed by the instant claims. The disclosure does not show (i) which portions of SEQ ID NO: 2 or SEQ ID NO: 3 are critical to the activity of the CNG2B polypeptide of SEQ ID NO: 1; and (ii) what modifications (e.g., substitutions, deletions or additions) one can make to SEQ ID NO: 2 or SEQ ID NO: 3 will result in protein mutants with the same functions as the claimed CNG2B protein of SEQ ID NO: 1. The state of the art (See, e.g., Ngo, et al, *The Protein Folding Problem and Tertiary Structure Prediction*, 1994, Merz, et al. (ed.), Birkhauser, Boston, MA, pp. 433 and 492-495) is such that the relationship between sequence of a protein and its activity is not well understood and is not predictable. Excising out portions of a protein or modifications to a protein, e.g., by substitutions or deletions, would often result in deleterious effects to the overall activity and effectiveness of the protein.

Accordingly, the disclosure fails to enable such a myriad of the claimed nucleic acid molecules that not only vary substantially in length but also in nucleic acid composition and to provide any guidance to one skilled in the art on how to make and use the claimed genus of nucleic acid molecules. Thus, it would require undue experimentation for one skilled in the art to make and use the claimed genus of the molecules embraced by the instant claims.

Claim Rejections—35 USC § 112, 1st paragraph

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 1, 3, 8, 19, and 20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

The description discloses two nucleotide sequences set forth in SEQ ID NOS: 1 and 3, which encode a polypeptide of SEQ ID NO: 2. However, Claims 1, 3, and 8 as written recite a genus of nucleic acid molecules encoding a polypeptide comprising an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 1 or comprising a nucleotide sequence having at least 90% sequence identity to SEQ ID NO: 2 or SEQ ID NO: 3. Thus, the claims encompass a huge number of nucleic acids that vary substantially both in length and in nucleotide composition.

The instant disclosure of nucleic acids set forth in SEQ ID NOS: 1 and 3 that encode the CNG2B polypeptide of SEQ ID NO: 1 does not adequately support the scope of the claimed genus, which encompasses a substantial variety of subgenera including full-length genes. A description of a genus of cDNA may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus, or of a recitation of structural features common to the genus, which features constitute a substantial portion of the genus. *Regents of the University of California v. Eli Lilly & Co.*, 119 F3d 1559, 1569, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). The instant disclosure fails to provide

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sufficient description information, such as definitive structural or functional features of the claimed genus of polynucleotides. There is no description of the conserved regions that are critical to the structure and function of the genus claimed. There is no description of the sites at which variability may be tolerated and there is no information regarding the relation of structure to function. The prior art does not provide compensatory structural or correlative teachings to enable one skilled in the art to identify the encompassed polynucleotides as being identical to those instantly claimed.

Due to the breadth of the claim genus and lack of the definitive structural or functional features of the claimed genus, one skilled in the art would not recognize from the disclosure that the applicant was in possession of the claimed genus.

Claim Rejections—35 USC § 112, 2nd paragraph

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 5, 6, 7, and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites "selectively hybridize under stringent hybridization conditions"; Claim 6 recites "selectively hybridizes under moderately stringent hybridization conditions"; Claims 7 and 9 recite "specifically hybridizing under stringent conditions".

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However, the specific conditions are not given in the claims. Neither the specification nor the relevant literature provides an unambiguous definition for the two terms.

Claim Rejections—35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

14. Claim 9 is rejected under 35 U.S.C. 102(a) as being anticipated by Birren et al (GenBank, Accession No. AC036216, May 4, 2000).

Birren et al teach a nucleic acid molecule comprising 651 contiguous nucleotides of SEQ ID NO: 3 (see attached sequence alignment), which encodes an amino acid sequence of SEQ ID NO: 1. Thus, the complement of nucleic acid molecule taught by Birren et al, by its nature, hybridizes to SEQ ID NO: 3, meeting the limitation of Claim 9.

Claim Objections—Minor Informalities

15. Claims 1, 7, and 8 are objected to because it recites the abbreviation “CNG” or “CNG2B”, which should be spelled out in all independent claims in the interest of clarity.
16. Claim 5 is objected to because it recites unelected subject matter (nucleotide sequences). Appropriate correction is required.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ruixiang Li whose telephone number is (703) 306-0282. The examiner can normally be reached on Monday-Friday, 8:30 am-5:00 pm.

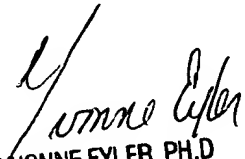
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler, can be reached on (703) 308-6564. The fax phone number for this Group is (703) 305-3014 or (703) 308-4242.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [yvonne.eyler@uspto.gov].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Ruixiang Li
Examiner
July 4, 2002


YVONNE EYLER, PH.D.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600